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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,556	05/23/2005	Volker Kronseder	30051/40497	3905

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MARSHALL, GERSTEIN & BORUN LLP
233 SOUTH WACKER DRIVE
6300 WILLIS TOWER
CHICAGO, IL 60606-6357

EXAMINER	
HORNING, JOEL G	

ART UNIT	PAPER NUMBER
1712	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/517,556	KRONSEDER ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4 and 6-17* is/are pending in the application.

4a) Of the above claim(s) *7-12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6 and 13-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Status of Application

1. By amendment filed April 13th, 2010, Claims 1 and 16 have been amended. Claims 1, 2, 4 and 6-17 are currently pending.

Election/Restrictions

2. **Claims 7-12** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 01-13-2009.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 1, 2, 6, 13 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruhashi et al (US 4393106) in view of Heiremans et al (US 4181239) in view of Pocock et al (US 4534995) in view of Kuckertz et al (US 6613394) in view of Tanaka et al (US 5071906) in view of Jorgens (US 5474610) as evidenced by Widenhouse et al (US2002/0169493) and .

Claim 1 is directed towards a method for manufacturing hollow bodies <u>made of PET</u> with gas barrier coating agent based upon PVA (poly(vinyl alcohol)) wherein said hollow bodies are:

a. treated by flaming to increase surface energy then;

b. electrostatically discharging the surface by ionized air;

c. maintaining the warming of the hollow body from the flaming step;

d. coating the surface by swelling it with a <u>PVOH</u> coating agent;

e. allowing the coating agent to drip off;

f. drying the coating

Maruhashi et al teach a process for manufacturing hollow bodies with gas barrier coatings (abstract and col 1, lines 6-18), including those made of PET (col 7, line 64 through col 8, line 25), wherein the hollow body is given a preliminary

treatment to increase the substrate surface energy (increase wetting), such as a corona discharge treatment (col 10, lines 33-38). After the pretreatment, the hollow body is coated with a barrier layer material (col 10, lines 26-33). The coated material is then dried (col 11, lines 19-24). Maruhashi et al's goal is to produce a body with excellent gas barrier layer properties (col 1, lines 6-18) and teach the use of and effectiveness of many different materials (table 1), but they do not specifically teach using polyvinyl alcohol as the barrier coating material, using flaming as the energy increasing step, or discharging the body with ionized air.

However, Heiremans et al teach the use of polyvinyl alcohol as a gas barrier layer coating for hollow bodies. They teach that polyvinyl alcohol has an oxygen permeability of 6.24×10^{-17} ml.cm/cm^2 sec.cmHg (col 4, line 47), which is more than two orders of magnitude better oxygen resistance than any barrier material listed in Table 1 of Maruhashi et al.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a polyvinyl alcohol based coating as the barrier coating on the hollow bodies in order to improve the hollow bodies barrier property or in order to use thinner barrier films.

Additionally, Kuckertz et al teach that corona discharge methods have disadvantages, like the production of pin holes in the coatings (col 3, lines 19-21) and electrostatic charging. They teach that their method of exposing the surface to “an atmospheric plasma generated by an indirect plasmatron” avoids this disadvantage while still increasing surface energy (improving wettability) and

increasing adhesion (col 4, lines 6-24). The surface to be treated is exposed to hot plasma with process gas/aerosol, which is a flaming process (col 7, lines 15-26).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a flaming process instead of a corona discharge method in order to avoid electrostatic charging and pin holes in the coatings while still increasing the surface energy and improving adhesion of the coating deposited afterwards.

Furthermore, Pocock et al teach a method for treating hollow bodies to improve their barrier properties. In that method they teach that positively charged containers will collect dust from the air, which results in imperfections in the coating. They teach that conditioning the container with ionized air (electrostatically discharging it) before depositing the barrier coating will give the container a slightly negative charge and avoid this problem (col 2, lines 45-56).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to electrostatically discharge the container with ionized air before applying the barrier coating in order to reduce imperfections in the coating.

Regarding the limitation that the heat of the flaming step be maintained, Kuckertz et al teaches that the flaming (first pretreatment) process heats up the substrate, so the process should be controlled so that the substrate does not heat up so much that it reaches its melting temperature (col 1, line 67 through col 2, line 12): the substrate will be at an elevated temperature from this first preliminary treatment step. It will take some finite period of time after the treatment before this heat

energy can be conducted, convected or radiated away from the substrate. Thus for this period of time, the warming of the substrate from the first preliminary treatment step is maintained.

Regarding the swelling limitation. Maruhashi et al teaches that an appropriate organic solvent should be used for the film forming resin used (col 10, lines 48-60), but it does not specifically teach what organic solvent should be used for PVA.

However, Tanaka et al is directed towards forming films of PVA (col 4, lines 9-11) and it teaches that an especially preferred organic solvent for PVA is dimethyl sulfoxide (col 3, lines 45-55).

Furthermore, as evidenced by Widenhouse et al, when they are in contact, dimethyl sulfoxide swells PET (table 1).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use dimethyl sulfoxide as the organic solvent for PVA, which will result in the PET swelling with a polyvinyl alcohol coating agent present (PVA is in the solvent), it is obvious to use this solvent since it was known to be an especially preferred organic solvent for PVA and would produce predictable results.

Regarding the limitation that the coating agent drip off, Maruhashi et al teach that coating can be performed by dipping the hollow body in the coating agent (col 10, lines 26-29), but it does not specifically teach dripping the coating agent off of the hollow body.

However, Jorgens is also directed towards dip coating of hollow bodies (abstract), it further teaches that when the hollow bodies are removed from the dip

bath, excess coating agent is allowed to drip off of the hollow body, in order to remove the excess coating agent, the hollow body can then be dried (col 2, lines 20-25).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to allow coating agent to drip off of the hollow body after the dip coating process in order to remove the excess coating agent before drying the film **(claim 1)**.

4. Regarding **claim 2**, Kuckertz et al teaches that when the treated surface is polyethylene teraphthalate (PET), they used a flaming process to increase the surface energy to 62-64mN/m (table 2).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to increase the PET surface energy to 62-64mN/m since that is a surface energy taught to be suitable when trying to increase the wettability of the PET.

5. Regarding **claims 2 and 13**, as discussed previously, Maruhashi et al teaches the desirability of increasing the substrate surface energy (increase wetting) by using a plasma treatment (col 10, lines 33-38), as does Kuckertz, which teaches that increasing the surface energy (surface tension) of the substrate by the plasma treatment increases the wettability of that surface (col 6, lines 1-15). In other words, the surface energy is a result effective variable for determining the wettability of the substrate, with higher surface energies come increased wettability.

It would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of “greater than 70mN/m” through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

6. Regarding **claims 6 and 15**, Maruhashi et al teach that the appropriate drying process conditions are changed depending upon the thickness of the coating layer, and that drying at a temperature range between 40°C and 160°C is usually sufficient (col 11, lines 19-34). This overlaps with applicants claimed temperature ranges. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Heiremans et al teach that polyvinyl alcohol is sensitive to humidity with a decrease in its barrier properties towards oxygen with increasing absorption of humidity (col 5, lines 9-15).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to dry the polyvinyl alcohol coating using an environment with no moisture present in order to avoid degrading the barrier layer properties of the coating. This of course falls within the claimed range of less than 3 g/m^3 of water.

7. **Claims 4 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruhashi et al in view of Heiremans et al in view of Pocock et al in view of Kuckertz et al in view of Tanaka et al in view of Jorgens as applied to claim 1 above,

and further in view of Hostettler et al (US 6017577) as evidenced by Rao et al (Journal of the American Oil Chemists' Society, vol 34, number 12 (1957). p 610-611).

Claim 4 further requires an additional preliminary treatment of the surface with a fat dissolving agent before the surface energy increasing treatment. Maruhashi et al in view of Heiremans et al in view of Pocock et al in view of Kuckertz et al in view of Tanaka et al in view of Jorgens teaches that plasma treatments on those substrates, like corona discharge or flaming to increase their surface energy, but they do not teach a treatment before the plasma treatment.

However, Hostettler et al teaches that "it is often advantageous to pretreat the polymeric substrate surface before plasma treatments with polar or nonpolar organic solvents… in order to remove any surface impurities…"(col 9, lines 62-66). These surface impurities can interfere with the plasma treatment (col 10, lines18-19). Hostettler et al teach using ethyl alcohol (ethanol) as a suitable solvent **(claim 14)**, which, according to Rao et al is also a fat dissolving agent (page 610).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to treat the surface of the hollow body with ethyl alcohol before the plasma treatment in order to remove impurities that could interfere with the efficacy of the plasma treatment **(claim 4)**.

8. **Claims 16 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruhashi et al in view of Heiremans et al in view of Pocock et al as applied to claim 1 above, and further in view of Hostettler et al (US 6017577) as evidenced by Rao

et al (Journal of the American Oil Chemists' Society, vol 34, number 12 (1957). p 610-611).

Claim 16 is directed towards a method for manufacturing hollow bodies with gas barrier coating agent based upon polyvinyl alcohol wherein said hollow bodies are:

a. Treated with a fat dissolving agent, then
b. pretreated to increase surface energy, then
c. electrostatically discharging the surface,
d. coating the surface, and then
e. drying the surface

Maruhashi et al teach a process for manufacturing hollow bodies with gas barrier coatings (abstract and col 1, lines 6-18) wherein the hollow body is given a preliminary treatment to increase the substrate surface energy (increase wetting), such as a corona discharge treatment (col 10, lines 33-38). After the pretreatment, the hollow body is coated with a barrier layer material (col 10, lines 26-33). The coated material is then dried (col 11, lines 19-24). Maruhashi et al's goal is to produce a body with excellent gas barrier layer properties (col 1, lines 6-18) and teach the use of and effectiveness of many different materials (table 1), but they do not specifically teach using polyvinyl alcohol as the barrier coating material.

However, Heiremans et al teach the use of polyvinyl alcohol as a gas barrier layer coating for hollow bodies. They teach that polyvinyl alcohol has an

oxygen permeability of 6.24 X 10^{-17} ml.cm/cm^2 sec.cmHg (col 4, line 47), which is more than two orders of magnitude better oxygen resistance than any barrier material listed in Table 1 of Maruhashi et al.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a polyvinyl alcohol based coating as the barrier coating on the hollow bodies in order to improve the hollow bodies barrier property or in order to use thinner barrier films.

Furthermore, Pocock et al teach a method for treating hollow bodies to improve their barrier properties. In that method they teach that positively charged containers will collect dust from the air, which results in imperfections in the coating. They teach that conditioning the container with ionized air (electrostatically discharging it) before depositing the barrier coating will give the container a slightly negative charge and avoid this problem (col 2, lines 45-56).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to electrostatically discharge the container before applying the barrier coating in order to reduce imperfections in the coating.

Regarding the preliminary treatment of the surface with a fat dissolving agent before the surface energy increasing treatment. Maruhashi et al in view of Heiremans et al in view of Pocock et al teach the production of polymeric hollow bodies (for examples, the abstract of Maruhashi). As stated above, they teach plasma treatments on those substrates, like corona discharge to increase their surface energy, but they do not teach a treatment before the plasma treatment.

However, Hostettler et al teach that “it is often advantageous to pretreat the polymeric substrate surface before plasma treatments with polar or nonpolar organic solvents… in order to remove any surface impurities…”(col 9, lines 62-66). These surface impurities can interfere with the plasma treatment (col 10, lines18-19). Hostettler et al teach using ethyl alcohol (ethanol) as a suitable solvent **(claim 17)**, which, according to Rao et al is also a fat dissolving agent (page 610).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to treat the surface of the hollow body with ethyl alcohol before the plasma treatment in order to remove impurities that could interfere with the efficacy of the plasma treatment **(claim 16)**.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 2, 4, 6 and 13-17 have been considered but are not convincing in view of the new ground(s) of rejection necessitated by amendment.

10. Applicant argues the position that incorporation of the teaching of Heiremans into Maruhashi would render Maruhashi inoperable for its intended purpose and change its principle of operation.

11. Applicant specifically argues that using polyvinyl alcohol as a barrier layer material, as taught by Heiremans in the process of Maruhashi would make Maruhashi inoperable for its intended purpose because polyvinyl alcohol has a lower humidity resistance than what would be desired by Maruhashi. However, both Heiremans

(abstract) and Maruhashi (abstract) are directed towards making containers that are oxygen and humidity resistant, so the teaching of Heiremans is compatible with humidity and oxygen resistance, and so the combination should be operable. As a clarification in light of applicants arguments and amendment to the claim, as applicant has noted in their remarks, Heiremans specifically deals with the lower humidity resistance of polyvinyl alcohol, and teaches the solution to that problem of enclosing the polyvinyl alcohol barrier layer with additional humidity barrier layers (as needed to improve humidity resistance, such as polyvinylidene chloride (col 5, lines 9-18). Thus, if the humidity resistance of polyvinyl alcohol was a problem, such layers would be present per the teaching of Heiremans and the containers produced by the process of Maruhashi in view of Heiremans would operate well as oxygen barriers, even in the presence of humidity. As a further clarification, though it is not required by the claim or the art, as taught by Wessling (Journal of Applied Polymer Science Vol 14. pp 1531-1545 (1970)) in table VIII, polyvinylidene chloride is soluble in dimethyl sulfoxide, so even if the polyvinyl alcohol solution was coated directly onto a polyvinylidene chloride layer, it would be expected to swell it.

12. Applicant then argues that the intended purpose of Maruhashi is reduced humidity dependency of the oxygen barrier. The examiner disagrees, the intended purpose of Maruhashi is to make containers, specifically ones that are moisture and oxygen resistant, and Maruhashi is particularly concerned with doing so for such things as “vessels for preserving foods for a long time or as vessels for cosmetics and the like where a high flavor retaining property is required” (col 1, lines 30-34). Applying the

teaching of Heiremans to Maruhashi would produce a container that is moisture and oxygen resistant, so it is suitable for the intended use. Furthermore, a polyvinyl alcohol layer enclosed within humidity barrier layers would make a barrier layer with a "reduced humidity dependency of the oxygen barrier," so such a feature is present in Maruhashi in view of Heiremans.

13. Applicant then notes that Heiremans teaches the presence of additional humidity resistant layers around the PVOH layer of the barrier film. The examiner would like to in turn note that the presence of such additional layers presents no conflict with applicant's claims, which are only required to comprise the PVOH layer.

14. Regarding the argument that Heiremans changes the principle of operation of Maruhashi, applicant has not detailed in what way they believe the principle of operation has changed, so the examiner cannot respond to it.

Conclusion

15. Applicant's amendment necessitated any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./

Examiner, Art Unit 1712

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1712